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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/873,465	06/04/2001	Allen Joseph Rushing	105	3881

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EXAMINER
SEVER, ANDREW T

ART UNIT	PAPER NUMBER
2851	

DATE MAILED: 04/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/873,465	RUSHING, ALLEN JOSEPH	
	Examiner	Art Unit	
	Andrew T Sever	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-17 is/are rejected.

7)☒ Claim(s) 1-17 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 04 June 2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 1-17 are objected to because of the following informalities: the grammar is bad. Appropriate correction is required.

For example claim 1 third line states in part "a controller circuit having electrical connection to each said sensor", this would be better written as "a controller circuit having electrical connections to each of the said sensors" or "a controller circuit having an electrical connection to each of the said sensors". Other similar errors are found throughout the claims. In general the claims are difficult to read due to similar grammatical errors. Appropriate correction is required

2. Claims 2-17 are objected to because of the following informalities:

The term "at least one" in claims 2-17 is a relative term, which renders the claims indefinite. The term "at least" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. Appropriate correction is required.

For example independent claim 12 claims at least one locatable probe containing at least one sensor. This could be read on a great number of inventions; for example the following three inventions: 1. A densitometer with one locatable probe and one sensor; 2. A densitometer with 5,000 locatable probes with each having 1 sensor; 3. A densitometer with 1 locatable probe having 5,0000 sensors within it. Appropriate correction is required.

3. Claims 2, 3, 7, 8, 9, 11, 14, 15, and 16 are objected to because of the following informalities: applicant in independent claim 1 and elsewhere describes the densitometer as comprising a plurality of sensors, each of these sensors is then claimed in the dependent claims to comprise a light emitter and a "sensor." The word "sensor" appears to have two meanings in the claims, first for the overall sensor and then for the light detector/photodiode. Applicant should change the second usage to light detector or some other appropriate word. For purposes of the prior art rejection, where it is understood that the applicant is claiming the actual component that detects the light, which has previously impinged upon the sample, the examiner will refer to that component as the "detector" or "light detector" as appropriate. Appropriate correction is required to eliminate the confusion.

4. Claim 17 recites the limitation "said light-to-frequency converter" in claim 12. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 does not have a light-to-frequency converter; rather this is introduced in claim 13.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim17 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

It is not clear what applicant is claiming in claim 17, or how this is enabled by the specification. One understanding of the claim language would suggest that the probes are not connected to anything since the connector and the converter's are at opposite ends. Since this claim is not clear, it will not be further searched and no prior art rejection will be applied, since it is unclear what is being claimed.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 5, 7, 8, 12, 14, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Izumizaki et al. (US 6,505,010).

Izumizaki teaches in figure 4 a multi-channel densitometer for measuring the optical density of a sample (7) at a plurality of sensor positions. The densitometer comprises of a plurality of sensors (33) disposed relative to the sample (7) so that each sensor receives light impinging first upon the sample and then from the sample to a detector(s). The detector then outputs a signal to a controller circuit (26) characteristic of the light intensity incident on the detector. The controller circuit provides power to the sensors (inherent and as shown in circuit diagram figure 1). The controller circuit collects signals characteristic of the optical density of the sample at a plurality of sensor positions. As taught in column 7 lines 5-50 the densitometer computes the optical density of at least one from the group of the following functions: toner uniformity, net density, transfer efficiency (lines 17-21 teach that the density detectors are checking for discrepancies in transferred patches), and color (each color has its own densitometer to insure uniformity) as is claimed by applicant's claim 5.

With regards to applicant's claims 7, 8, 14,and 16, Izumizaki teaches in column 5 lines 30-37 the structure of the sensors. Specifically Izumizaki teaches they comprise of a light emitting diode (LED 33a) as is claimed by applicant's claim 8, which emits light that impinges first upon the sample. From the sample the light impinges on a detector (33b); the emitter (33a) and the detector (33b) forming an emitter-detector pair (33). As shown in figure 4, the emitter and detector are disposed on the same side of the sample as is claimed by applicant's claim 16.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 2, 3, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izumizaki et al (US 6,505,010) as applied to claims 1, 5, 7, 8, 12, 14, and 16 above, and further in view of Merchant et al. (US 6,370,408.)

As described in more detail above, Izumizaki teaches a multi-channel densitometer for measuring optical density of a sample at a plurality of sensor position. Izumizaki's densitometer comprises a plurality of sensors that operate by having each of the sensors shine a light at a sample and then having the sensors receive the lights after

they impinge upon the sample. The sensors then output a signal to a controller circuit characteristic of the intensity of the light received by the sensors.

Izumizaki, however, does not necessarily teach that the sensors are light-to-frequency converters having a frequency output such that the frequency of the output is related to the intensity of the incident light. Light-to-frequency converters however are well known in the art for the purpose of replacing photodiode and A/D converters. Merchant et al teaches an optical sensor which has the same construction as the claimed densitometer sensor (the sensor is specified to comprise an LED or other light source for emitting a light beam and a photodetector). Merchant teaches in column 6 lines 40-58 that the photodetector and A/D converter can be replaced with a light-to-frequency converter such as the Texas Instruments TSL220. Merchant teaches that there are several advantages to using a light-to-frequency converter over the prior art photodetector and A/D converter, namely the light-to-frequency converter reduces overall system cost, can be used with multiple channels allowing multiple sensors as is the case in the present invention, and the output frequency range can be varied and programmed to fall within a predetermined period (those with ordinary skill in the art recognize that period is the reciprocal of frequency) as is claimed by applicant's claim 3. Since as taught by Merchant there are many advantages of the light-to-frequency converter over the prior art detector of a photodetector and A/D converter, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the detector/receiver component of the sensors in Izumizaki's densitometer a light-to-frequency converter.

10. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izumizaki et al (US 6,505,010) as applied to claims 1, 5, 7, 8, 12, 14, and 16 above, and further in view of Budnik et al. (US 5,903,796.)

As described in more detail above, Izumizaki teaches a multi-channel densitometer for measuring optical density of a sample at a plurality of sensor position. Izumizaki's densitometer comprises a plurality of sensors that operate by having each of the sensors shine a light at a sample and then having the sensors receive the lights after they impinge upon the sample. The sensors then output a signal to a controller circuit characteristic of the intensity of the light received by the sensors

Izumizaki, however, does not necessarily teach outputting the sample optical density values to at least one receiving device from the group comprising of host computers, networks, alphanumeric displays, graphic displays, digital storage devices, digital-to-analog converts, and means for adjusting subsequent sample processing. Budnik teaches in column 7 lines 4-34 the use of an optical densitometer to determine the density of print material on a surface. Budnik further teaches in column 7 lines 54 through column 8 lines 11 that data from the densitometer (TAC sensor) is outputted to a host computer and to display for notifying an operator that a system needs service. Budnik teaches in column 3 lines 59-62 that this function is useful in that it minimizes machine downtime and keeps extensive service to a minimum. Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to output the sample optical density values obtained by the densitometer in Izumizaki's image forming apparatus to at least one device from the group consisting of host

computers, networks, alphanumeric displays, graphic displays, digital storage devices, digital-to-analog converters, and means for adjusting subsequent sample processing as is taught by Budnik.

11. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izumizaki et al (US 6,505,010) as applied to claims 1, 5, 7, 8, 12, 14, and 16 above, and further in view of Rakitsch (US 5,854,680.)

As described in more detail above, Izumizaki teaches a multi-channel densitometer for measuring optical density of a sample at a plurality of sensor position. Izumizaki's densitometer comprises a plurality of sensors that operate by having each of the sensors shine a light at a sample and then having the sensors receive the lights after they impinge upon the sample. The sensors then output a signal to a controller circuit characteristic of the intensity of the light received by the sensors

Izumizaki, however, does not teach the emitter-sensor pairs being of differing emitter colors, whereby areas of the sample of differing colors can be measured with high sensitivity using light emitters of complementary color to the respective areas. Rakitsch teaches in figure 4 a densitometer that uses a set of three light emitters of red, green, and blue color that are transmitted through fiber optics 10 to illuminate substantially the same spot of the sample and as taught in column 5 lines 41-55 the light emitters are successively energized one at a time as is claimed by applicant's claims 10 and 11. Rakitsch teaches in column 6 lines 53-61 that the use of the three LED's allows the densitometer to measure the ink density values for printing ink colors cyan, magenta,

yellow, and black instead of just black. Since color copiers and printers are increasingly popular and therefore the need for densitometers that are effective for multiple colors is accordingly increasing greatly; it would have been obvious to one of ordinary skill in the art at the time the invention was made to include Rakitsch three color LED sensor in Izumizaki's densitometer.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Izumizaki et al (US 6,505,010) as applied to claims 1, 5, 7, 8, 12, 14, and 16 above, and further in view of Hameister et al. (US 6,427,057.)

As described in more detail above, Izumizaki teaches a multi-channel densitometer for measuring optical density of a sample at a plurality of sensor position. Izumizaki's densitometer comprises a plurality of sensors that operate by having each of the sensors shine a light at a sample and then having the sensors receive the lights after they impinge upon the sample. The sensors then output a signal to a controller circuit characteristic of the intensity of the light received by the sensors

Izumizaki's sensors are reflection type sensors, however it is well known in the densitometer art those reflection and transmission type sensors are interchangeable. For example Hameister teaches in figure 1 a transmission type sensor for a densitometer, however in column 4 lines 4-6 Hameister teaches the densitometer could also be a reflection densitometer. Since it is well known that transmission type sensors are interchangeable with reflection type sensors in densitometers, it would have been obvious to one of ordinary skill in the art to have used a transmission type sensor, such as the one

taught by Hameister in Izumizaki's densitometer instead of at least one of Izumizaki's reflection type sensors.

Double Patenting

13. Claims 2, 3, and 13 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Izumizaki et al (US 6,505,010) as applied to claims 1, 5, 7, 8,12, 14, and 16 above and further in view of claim 21 of copending Application No. 10/095166.

As described in more detail above, Izumizaki teaches a multi-channel densitometer for measuring optical density of a sample at a plurality of sensor position. Izumizaki's densitometer comprises a plurality of sensors that operate by having each of the sensors shine a light at a sample and then having the sensors receive the lights after they impinge upon the sample. The sensors then output a signal to a controller circuit characteristic of the intensity of the light received by the sensors

Izumizaki, however, does not necessarily teach that the sensors are light-to-frequency converters having a frequency output where the frequency of the output is related to the intensity of the incident light. The applicant claims in the copending application that after the light impinges upon the test sample it goes to a light-to-frequency converter, which has a frequency output characteristic of the intensity of the light incident on the light-to-frequency converter. Further the copending application claims that the controller circuit (circuit is not explicitly claimed, but is inherently

present) measures the period of the frequency output in terms of a period count being at least within a predetermined range. It divides this period by a divisor selected from a group of at least one predetermined divisor to yield a period quotient within the predetermined range (as is claimed by the current application's claim 3). By employing lookup tables, the system is able to obtain a scaled density value of the test sample. Since as taught above by Merchant that there are many advantages to the use of a light-to-frequency converter over other prior art detector, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the detector in the sensors of Izumizaki's densitometer, light-to-frequency converters.

This is a provisional obviousness-type double patenting rejection.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 5,237,181 to Kerkhoff et al. teaches a transmission type densitometer.

US 5,471,282 to Hayashi et al. teaches in figure 2 an optical densitometer (208) and appears to teach additional though unlabeled sensors.

The following two patents to the present inventor should also be examined for possible double patenting.

US 6,229,972

US 6,144,024

15. While an inventor may prosecute the application, lack of skill in this field usually acts as a liability in affording the maximum protection for the invention disclosed. Applicant is advised to secure the services of a registered patent attorney or agent to prosecute the application, since the value of a patent is largely dependent upon skilled preparation and prosecution. The Office cannot aid in selecting an attorney or agent.

Applicant is advised of the availability of the publication "Attorneys and Agents Registered to Practice Before the U.S. Patent and Trademark Office." This publication is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Sever whose telephone number is 703-305-4036. The examiner can normally be reached M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russell Adams can be reached at 703-308-2847. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

AS
April 25, 2003

RUSSELL ADAMS
SUPERVISORY PATENT EXAMINER
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